STATE OF CALIFORNIA

CONTRACT REQUESTS FORM (CRF)

CEC-94 (Revised 5/11) CALIFORNIA ENERGY COMMISSION

☒ New Contract 500-11-006 ☐ Amendment to Existing Contract: _____ Amendment Number: _____

Division	Contract Manager:	MS-	Phone	CM Training Date
Energy Research and Development	Jamie Patterson	43	916-327-2342	1/21/1998

Contractor's Legal Name	Federal ID Number
San Diego Gas & Electric Company	95-1184800

Title of Project
Determining Best Location for Energy Storage to Maximize Effectiveness with Residential Renewable Generator

Term	Start Date	End Date	Amount
New/Original Contract	11/7/2011	5/7/2014	$ 539,350

Line up the Amendment information as best as possible within the following table.

Amendment #	End Date *(mm/dd/yy)*	Amount

Business Meeting Information			
Proposed Business Meeting Date	9/21/2011	☐ Consent	☒ Discussion
Business Meeting Presenter	Jamie Patterson	Time Needed:	5 minutes

Agenda Item Subject and Description

Possible approval of Contract 500-11-006 for $539,350.00 with San Diego Gas & Electric Company to determine the best location for energy storage to maximize effectiveness with residential renewable generator clusters. (PIER electricity funding) Contact: Jamie Patterson (5 minutes)

Business Meeting approval is not required for the following types of contracts: *Executive Director's signature is required in all cases.*

☐ Contracts less than $10k *(Policy Committee's signature is also required)*

☐ Amendment for a no-cost time extension. Must be first extension, less than one year and original contract less than $100k.

☐ Contracts less than $25k for Expert Witness in Energy Facility licensing cases and amendments.

Purpose of Contract or Purpose of Amendment, if applicable

This project will install energy storage devices; at strategic points along a distribution feeder. The units will be connected to the utility grid at the secondary voltage level of a distribution transformer. The storage units will be made to operate in a self-directed, autonomous manner to improve local service to a few customers, or operate as a fleet to impact the operation of a whole distribution feeder. This project will test the operation of the storage units and assess their effectiveness in responding to voltage and current fluctuations experienced by the distribution feeder. It will also provide new research information as to the best locations for storage to maximize its effectiveness. The San Diego Gas and Electric Company is a good candidate for this research as their service area has a high number of renewable clusters for research purposes. There is interest by the other utilities in California and the information from this research will be made available to them.

California Environmental Quality Act (CEQA) Compliance

1. Is Contract considered a "Project" under CEQA?
   ☒ Yes: skip to question 2 ☐ No: complete the following (PRC 21065 and 14 CCR 15378):
   Explain why contract is not considered a "Project":

2. If contract is considered a "Project" under CEQA:
   ☒ a) Contract **IS** exempt. (Draft NOE required)
   ☐ Statutory Exemption. List PRC and/or CCR section number:
   ☒ Categorical Exemption. List CCR section number: 14 CCR 15301
   ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
   Explain reason why contract is exempt under the above section:
   The project will not cause a direct or reasonably foreseeable indirect physical change in the environment because it involves integrating energy storage devices into an existing distribution circuit by analyzing circuit configuration, implementing algorithms, and testing devices.

   ☐ b) Contract **IS NOT** exempt. The Contract Manager needs to consult with the Energy Commission attorney assigned to their division and the Siting Office regarding a possible Initial Study.

Budgets Information

Contract Amount Funded		Breakdown by FY			Funding Sources			
Funding Source	Amount	FY	Amount	Approved?	Funding Source	FY	Budget List No.	Amount
ARFVTF	$	11-12	$539,350	Yes	PIER-E	10-11	501.027I	$539,350
ECAA	$		$					$
State- ERPA	$		$					$
Federal	$		$					$
PIER - E	$539,350		$					$
PIER - NG	$		$					$
Reimbursement	$		$					$
Other	$		$					$
TOTAL:	$539,350	TOTAL:	$539,350				TOTAL:	$539,350
Reimbursement Contract #:					Federal Agreement			

Contractor's Administrator/ Officer		Contractor's Project Manager	
Name:	William Torre	Name:	William Torre
Address:	8316 Century Park Ct	Address:	8316 Century Park Ct
City, State, Zip:	San Diego, CA 92123-1582	City, State, Zip:	San Diego, CA 92123-1582
Phone/ Fax:	858-654-8349 / 858-654-8643	Phone/ Fax:	858-654-8349 / 858-654-8643
E-Mail:	wtorre@sdge.com	E-Mail:	wtorre@sdge.com

Contractor Is

☒ Private Company *(including non-profits)*
☐ CA State Agency *(including UC and CSU)*
☐ Government Entity *(i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)*

Selection Process Used

☐ Solicitation Select Type Solicitation #: # of Bids: Low Bid? ☐ No ☐ Yes
☒ Non Competitive Bid *(Attach CEC 96)*
☐ Exempt Select Exemption

Civil Service Considerations

☐ Not Applicable (Contract is with a CA State Entity or a membership/co-sponsorship)
☒ Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)

☐ The Services Contracted:
- ☐ are not available within civil service
- ☐ cannot be performed satisfactorily by civil service employees
- ☐ are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system.

☐ The Services are of such an:
- ☐ urgent
- ☐ temporary, or
- ☐ occasional nature

that the delay to implement under civil service would frustrate their very purpose.

Justification:

Payment Method

☒ A. Reimbursement in arrears based on:
- ☒ Itemized Monthly ☐ Itemized Quarterly ☐ Flat Rate ☐ One-time

☐ B. Advanced Payment

☐ C. Other, explain:

Retention

1. Is contract subject to retention?	☐ No	☒ Yes
If Yes, Do you plan to release retention prior to contract termination?	☒ No	☐ Yes

Justification of Rates

San Diego Gas and Electric is regulated by the CPUC. Rates are reviewed and are in keeping with industry practice.,the wages are prevailing wages.

Disabled Veteran Business Enterprise Program (DVBE)

1. ☐ Not Applicable
2. ☒ Meets DVBE Requirements DVBE Amount:$ 21,000 DVBE %: 4
   - ☐ Contractor is Certified DVBE
   - ☒ Contractor is Subcontracting with a DVBE: Phazer Electric Inc.
3. ☐ Requesting DVBE Exemption (attach CEC 95)

Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE?	☒ No	☐ Yes
If yes, check appropriate box:	☐ SB ☐ MB	☐ DVBE

Is Contractor subcontracting any services?	☐ No	☒ Yes

If yes, give company name and identify if they are a Small Business (SB), Micro Business (MB) and/or DVBE:

Horizon Energy Group	☒ No	☐ SB	☐ MB	☐ DVBE
Phazer Electric Inc.	☐ No	☐ SB	☒ MB	☒ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE

Miscellaneous Contract Information		
1. Will there be Work Authorizations?	☒ No	☐ Yes
2. Is the Contractor providing confidential information?	☒ No	☐ Yes
3. Is the contractor going to purchase equipment?	☒ No	☐ Yes
4. Check frequency of progress reports ☒ Monthly ☐ Quarterly ☐		
5. Will a final report be required?	☐ No	☒ Yes
6. Is the contract, with amendments, longer than a year? If yes, why?	☐ No	☒ Yes

The Department of General Services has agreed to give the Commission blanket authority to execute multi-year contracts to support the Commission's RD&D Programs.

The following items should be attached to this CRF		
1. Scope of Work, Attach as Exhibit A.	☐ N/A	☒ Attached
2. Budget Detail, Attach as Exhibit B.	☐ N/A	☒ Attached
3. CEC 96, NCB Request	☐ N/A	☒ Attached
4. CEC 30, Survey of Prior Work	☒ N/A	☐ Attached
5. CEC 95, DVBE Exemption Request	☒ N/A	☐ Attached
6. Draft CEQA Notice of Exemption (NOE)	☐ N/A	☒ Attached
7. Resumes	☐ N/A	☒ Attached
8. CEC 105, Questionnaire for Identifying Conflicts		☒ Attached
9. CEC 106, IT Component Reporting Form		☒ Attached

Contract Manager	Date	Office Manager	Date	Deputy Director	Date

The following signatures are only required when contract approval is delegated to the Executive Office and not approved at a Business Meeting. See Business Meeting Information Section.

Presiding Policy Committee	Date	Associate Policy Committee	Date	Executive Director	Date

Proposed Agreement between California Energy Commission and San Diego Gas & Electric Company

Title: Determining Best Location for Energy Storage to Maximize Effectiveness with Residential Renewable Generator Clusters
Amount: $539,350.00
Term: 30 months
Contact: Jamie Patterson
Committee Meeting: 7/28/2011

Funding

FY	Program	Area	Initiative	Budget	This Project	Remaining Balance	
10	Electric	ETSI	Smart Grid	$6,236,303	$539,350	$767,379	12%

Recommendation

Approve this agreement with San Diego Gas & Electric Company for $539,350.00 to determine the best location for energy storage to mitigate residential renewable generator clusters. The length of this agreement is 36 months. Staff recommends placing this item on the discussion agenda of the Commission Business Meeting.

Issue

The distribution system is experiencing a number of new challenges as a result of high penetration of residential clusters of various types of distributed renewable generation, including wind and photovoltaic power. Some of these challenges are:

- Undesirable voltage variation - steady state and transient
- Frequency regulation
- System capacity issues related to uneven power flow
- Reactive power support

Energy storage is receiving increased attention by utility engineers and regulators for its potential to solve a wide number of distribution system technical challenges in the management of these clusters of renewables.

To integrate distributed energy storage systems to mitigate the technical problems associated with the intermittent nature of renewable resources, the best location to maximize the effectiveness of energy storage needs to be determined. The PIER program funds energy research to improve distribution capabilities to increase the distribution of energy from renewable resources. Legislation provides that up to 10 percent of the PIER funds shall be awarded to electrical corporations for distribution research that meets the goals and requirements of the PIER program.

Background

Customer-owned distributed generation (DG) in the form of renewable energy sources is beginning to appear on utility grids in ever larger numbers of installations. Currently, on the San Diego Gas and Electric system there are over 10,000 individual renewable energy installations in operation with a total

connected capacity of approximately 76 MW. The predominate type of DG installations are photovoltaic systems that collect solar energy, convert it to alternating current electricity and inject it into the utility electric grid. Wind and other renewable installations are also present. The systems are generally a few kW in capacity when located on residential roof tops, but may be hundreds of kW in capacity when installed at commercial/industrial facilities. One characteristic of renewables is intermittancy. This intermittency in power production in areas where a high penetration of renewable systems exists can produce a number of electric system operating challenges, especially in areas where the electric grid is not particularly strong.

Proposed Work

This project will install storage devices; at strategic points along a distribution feeder. The units will be connected to the utility grid at the secondary voltage level of a distribution transformer. The storage units will be made to operate in a self-directed, autonomous manner to improve local service to a few customers, or operate as a fleet to impact the operation of a whole distribution feeder. This project will test the operation of the storage units and assess their effectiveness in responding to voltage and current fluctuations experienced by the distribution feeder. It will also provide new research information as to the best locations for storage to maximize its effectiveness. The San Diego Gas and Electric Company is a good candidate for this reseach as their service area has a high number of renewable clusters for research purposes. Stakeholder coordination is provided by a technical advisory group that will meet regularly to discuss the research. Costs for the project are 45% on direct labor, 29% on subcontractors and the rest on overhead. There is interest by the other utilities in California and the information from this research will be made available to them.

Justification and Goals

This project "[will develop, and help bring to market] advanced electricity technologies that reduce or eliminate consumption of water or other finite resources, increase use of renewable energy resources, or improve transmission or distribution of electricity generated from renewable energy resources" (Public Resources Code 25620.1.(b)(4)), (Chapter 512, Statutes of 2006)).

This project benefits California by increasing the capability of the distribution system to accept and manage renewable generation resources. This will allow Californians to connect their renewable generators to the grid.

This will be accomplished by:

- Determining the best location for energy storage, either at the substation or on the secondary side of the distribution transformer.

Exhibit A
SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		DESS Design
3	x	Techniques and Algorithms for the Control of DESS
4		Develop Test Plans for DESS
5		Conduct Test and Document Results

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Bill Torre- SDGE Ron Jordan- SDGE Gil Montes- SDGE		
2	Bill Torre- SDGE Ron Jordan- SDGE Gil Montes- SDGE	Phazer Electric (DVBE)	
3	Bill Torre- SDGE Ron Jordan- SDGE Gil Montes- SDGE	Phazer Electric (DVBE)	
4	Bill Torre- SDGE Ron Jordan- SDGE Gil Montes- SDGE		
5	Bill Torre- SDGE Ron Jordan- SDGE Gil Montes- SDGE		

GLOSSARY

Specific terms and acronyms used throughout this work statement are defined as follows:

Acronym	Definition
CPR	Critical Project Review
DER	Distributed Energy Resources (Storage, DG, PV)
DESS	Distributed Energy Storage System
DG	Distributed Generation
DR	Distributed Resources
DBVE	Disable Veterans Business Enterprises
Energy Commission	California Energy Commission

Acronym	Definition
kW	Kilowatt
MS	Microsoft
MW	Megawatt
PIER	Public Interest Energy Research
PQ	Power Quality
PV	Photovoltaic
SDG&E	San Diego Gas & Electric
TAC	Technical Advisory Committee
UCC.1	Uniform Commercial Code (Financing Statement)
VARs	Volt-Amps Reactive

Problem Statement
Customer-owned distributed generation (DG) in the form of renewable energy sources is beginning to appear on utility grids in ever larger numbers of installations. Currently, on the San Diego Gas and Electric (SDG&E) system there are over 10,000 individual renewable energy installations in operation with a total connected capacity of approximately 76 megawatts (MW). The predominate type of DG installations are photovoltaic (PV) systems that collect solar energy, convert it to alternating current electricity and inject it into the utility electric grid. These photovoltaic systems are generally a few kilowatts (kW) in capacity when located on residential roofs.

One characteristic all PV installations have in common is the intermittency of power production that results from variation in solar energy striking the PV cells due to changes in solar conditions: day time vs. nighttime, sunny hours vs. cloudy hours and the transition time between different conditions. This intermittency in power production in areas where a high penetration of PV systems exists can produce a number of electric system operating challenges, especially in areas where the electric grid is not particularly strong. Some of these challenges are:

- Undesirable voltage variation – steady state and transient
- Frequency regulation
- System capacity issues related to uneven power flow
- Reactive power support

Goals of the Agreement
The goal of this Agreement is to identify solutions to eliminate or mitigate these operating challenges using Distributed Energy Storage Systems (DESS).

Objectives of the Agreement
The objectives of this Agreement are to:
- Develop criteria for the installation of energy storage systems
- Install various devices on a distribution feeder
- Develop techniques for managing/dispatching energy storage devices
- Test the effectiveness of storage in mitigation of intermittency

- Quantify additional benefits of storage systems (peak shaving, VAR support, etc.)

TASK 1.0 ADMINISTRATION

MEETINGS

Task 1.1 Attend Kick-off Meeting
The goal of this task is to establish the lines of communication and procedures for implementing this Agreement.

The Contractor shall:

- Attend a "kick-off" meeting with the Commission Contract Manager, the Contracts Officer, and a representative of the Accounting Office. The Contractor shall bring their Project Manager, Contracts Administrator, Accounting Officer, and others designated by the Commission Contract Manager to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the Commission Contract Manager will provide an agenda to all potential meeting participants.

The administrative portion of the meeting shall include, but not be limited to, the following:

- Terms and conditions of the Agreement
- CPRs (Task 1.2)
- Match fund documentation (Task 1.7)
- Permit documentation (Task 1.8)

The technical portion of the meeting shall include, but not be limited to, the following:

- The Commission Contract Manager's expectations for accomplishing tasks described in the Scope of Work;
- An updated Schedule of Deliverables
- Progress Reports (Task 1.4)
- Technical Deliverables (Task 1.5)
- Final Report (Task 1.6)

The Commission Contract Manager shall designate the date and location of this meeting.

Contractor Deliverables:
- An Updated Schedule of Deliverables
- An Updated List of Match Funds
- An Updated List of Permits

Commission Contract Manager Deliverables:

- Final Report Instructions

Task 1.2 CPR Meetings
The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and if it should, are there any modifications that need to be made to the tasks, deliverables, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Contractor. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Contract Manager and as shown in the Technical Task List above and in the Schedule of Deliverables. However, the Commission Contract Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Contractor.

Participants include the Commission Contract Manager and the Contractor, and may include the Commission Contracts Officer, the PIER Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Contract Manager to provide support to the Energy Commission.

The Commission Contract Manager shall:

- Determine the location, date and time of each CPR meeting with the Contractor. These meetings generally take place at the Energy Commission, but they may take place at another location.

- Send the Contractor the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.

- Conduct and make a record of each CPR meeting. One of the outcomes of this meeting will be a schedule for providing the written determination described below.

- Determine whether to continue the project, and if continuing, whether or not to modify the tasks, schedule, deliverables and budget for the remainder of the Agreement, including not proceeding with one or more tasks. If the Commission Contract Manager concludes that satisfactory progress is not being made, this conclusion will be referred to the Energy Commission's Research, Development and Demonstration Policy Committee for its concurrence.

- Provide the Contractor with a written determination in accordance with the schedule. The written response may include a requirement for the Contractor to revise one or more deliverable(s) that were included in the CPR.

The Contractor shall:

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the projects. This report shall be submitted along with any other deliverables identified in this Scope of Work. Submit these documents to the Commission Contract Manager and any other designated reviewers at least 15 working days in advance of each CPR meeting.

- Present the required information at each CPR meeting and participate in a discussion about the Agreement.

Contractor Deliverables:
- CPR Report(s)
- CPR deliverables identified in the Scope of Work

Commission Contract Manager Deliverables:
- Agenda and a List of Expected Participants
- Schedule for Written Determination
- Written Determination

Task 1.3 Final Meeting
The goal of this task is to closeout this Agreement.

The Contractor shall:

- Meet with the Energy Commission to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.

  This meeting will be attended by, at a minimum, the Contractor, the Commission Contracts Officer, and the Commission Contract Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Commission Contract Manager.

  The technical portion of the meeting shall present findings, conclusions, and recommended next steps (if any) for the Agreement. The Commission Contract Manager will determine the appropriate meeting participants.

  The administrative portion of the meeting shall be a discussion with the Commission Contract Manager and the Contracts Officer about the following Agreement closeout items:

  - What to do with any state-owned equipment (Options)
  - Need to file UCC.1 form re: Energy Commission's interest in patented technology
  - Energy Commission's request for specific "generated" data (not already

provided in Agreement deliverables)
- Need to document Contractor's disclosure of "subject inventions" developed under the Agreement
- "Surviving" Agreement provisions, such as repayment provisions and confidential deliverables
- Final invoicing and release of retention

- Prepare a schedule for completing the closeout activities for this Agreement.

Deliverables:
- Written documentation of meeting agreements and all pertinent information
- Schedule for completing closeout activities

REPORTING

See Exhibit D, Reports/Deliverables/Records.

Task 1.4 Monthly Progress Reports
The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the research objectives of this Agreement.

The Contractor shall:

- Prepare progress reports which summarize all Agreement activities conducted by the Contractor for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Commission Contract Manager within 10 working days after the end of the reporting period. Attachment A-2, Progress Report Format, provides the recommended specifications.

Deliverables:
- Monthly Progress Reports

Task 1.5 Test Plans, Technical Reports and Interim Deliverables
The goal of this task is to set forth the general requirements for submitting test plans, technical reports and other interim deliverables, unless described differently in the Technical Tasks. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

http://www.energy.ca.gov/contracts/pier/contractors/

The Contractor shall:

- Unless otherwise directed in this Scope of Work, submit a draft of each deliverable listed in the Technical Tasks to the Commission Contract Manager for review and comment in accordance with the approved Schedule of Deliverables. The Commission Contract Manager will provide written comments back to the Contractor on the draft deliverable within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final deliverable to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final deliverable within 5 working days of receipt. Key elements from this deliverable shall be included in the Final Report for this project.

Task 1.6 Final Report
The goal of this task is to prepare a comprehensive written Final Report that describes the original purpose, approach, results and conclusions of the work done under this Agreement. The Commission Contract Manager will review and approve the Final Report. The Final Report must be completed on or before the termination date of the Agreement. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

http://www.energy.ca.gov/contracts/pier/contractors/

The Final Report shall be a public document. If the Contractor has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Contractor shall perform the following subtasks for both the public and confidential versions of the Final Report.

Task 1.6.1 Final Report Outline

The Contractor shall:

- Prepare a draft outline of the Final Report.

- Submit the draft outline of Final Report to the Commission Contract Manager for review and approval. The Commission Contract Manager will provide written comments back to the Contractor on the draft outline within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final outline to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final outline within 5 working days of receipt.

Deliverables:
- Draft Outline of the Final Report
- Final Outline of the Final Report

Task 1.6.2 Final Report

The Contractor shall:

- Prepare the draft Final Report for this Agreement in accordance with the approved outline.

- Submit the draft Final Report to the Commission Contract Manager for review and comment. The Commission Contract Manager will provide written comments within 10 working days of receipt.

  Once agreement on the draft Final Report has been reached, the Commission Contract Manager shall forward the electronic version of this report for Energy Commission internal approval. Once the approval is given, the Commission Contract Manager shall provide written approval to the Contractor within 5 working days.

- Submit one bound copy of the Final Report with the final invoice.

Deliverables:
- Draft Final Report
- Final Report

MATCH FUNDS, PERMITS, AND ELECTRONIC FILE FORMAT

Task 1.7 Identify and Obtain Matching Funds
The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. While the PIER budget for this task will be zero dollars, the Contractor may utilize match funds for this task. Match funds shall be spent concurrently or in advance of PIER funds during the term of this Agreement. Match funds must be identified in writing, and the associated commitments obtained before the Contractor can incur any costs for which the Contractor will request reimbursement.

The Contractor shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:

  1. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state such in the letter.

  2. If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:

- A list of the match funds that identifies the:
  - Amount of each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied.

  - Amount of each in-kind contribution, a description, documented market or book value, and its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Contractor shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.

- A copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured.

- Discuss match funds and the implications to the Agreement if they are significantly reduced or not obtained as committed, at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.

- Provide the appropriate information to the Commission Contract Manager if during the course of the Agreement additional match funds are received.

- Notify the Commission Contract Manager within 10 working days if during the course of the Agreement existing match funds are reduced. Reduction in match funds may trigger an additional CPR.

Deliverables:
- A letter regarding Match Funds or stating that no Match Funds are provided
- Letter(s) for New Match Funds
- A copy of each Match Fund commitment letter
- Letter that Match Funds were Reduced (if applicable)

Task 1.8 Identify and Obtain Required Permits
The goal of this task is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track.

Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement. While the PIER budget for this task will be zero dollars, the Contractor shall show match funds for this task. Permits must be identified in writing and obtained before the Contractor can incur any costs related to the use of the permits for which the Contractor will request reimbursement.

The Contractor shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:

    1. If there are no permits required at the start of this Agreement, then state such in the letter.

    2. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:

        - A list of the permits that identifies the:
            - Type of permit
            - Name, address and telephone number of the permitting jurisdictions or lead agencies
        - Schedule the Contractor will follow in applying for and obtaining these permits.

- The list of permits and the schedule for obtaining them will be discussed at the kick-off meeting, and a timetable for submitting the updated list, schedule and the copies of the permits will be developed. The implications to the Agreement if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in the progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the appropriate information on each permit and an updated schedule to the Commission Contract Manager.

- As permits are obtained, send a copy of each approved permit to the Commission Contract Manager.

- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Contract Manager within 5 working days. Either of these events may trigger an additional CPR.

Deliverables:

- A letter documenting the Permits or stating that no Permits are required
- Updated list of Permits as they change during the Term of the Agreement
- Updated schedule for acquiring Permits as it changes during the Term of the Agreement
- A copy of each approved Permit

Task 1.9 Electronic File Format
The goal of this task is to unify the formats of electronic data and documents provided to the Energy Commission as contract deliverables. Another goal is to establish the computer platforms, operating systems and software that will be required to review and approve all software deliverables.

The Contractor shall:

- Deliver documents to the Commission Contract Manager in the following formats:
  - Data sets shall be in Microsoft (MS) Access or MS Excel file format.
  - PC-based text documents shall be in MS Word file format.
  - Documents intended for public distribution shall be in PDF file format, with the native file format provided as well.
  - Project management documents shall be in MS Project file format.

- Request exemptions to the electronic file format in writing at least 90 days before the deliverable is submitted.

Deliverables:
- A letter requesting exemption from the Electronic File Format (if applicable)

TAC

Task 1.10 Establish the TAC *(The Contract Team will finalize this task and task 1.11)*

The goal of this task is to create an advisory committee for this Agreement.

The TAC should be composed of diverse professionals. The number can vary depending on potential interest and time availability. The exact composition of the TAC may change as the need warrants. TAC members serve at the discretion of the Commission Contract Manager.

The TAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter
- Members of the trades who will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives)
- Public Interest Market Transformation Implementers
- Product Developers relevant to project subject matter
- U.S. Department of Energy Research Manager
- Public Interest Environmental Groups
- Utility Representatives
- Members of the relevant technical society committees

The purpose of the TAC is to:

- Provide guidance in research direction. The guidance may include scope of research; research methodologies; timing; coordination with other research. The guidance may be based on:

  -technical area expertise
  -knowledge of market applications
  -linkages between the agreement work and other past, present or future research (both public and private sectors) they are aware of in a particular area.

- Review deliverables. Provide specific suggestions and recommendations for needed adjustments, refinements, or enhancement of the deliverables.
- Evaluate tangible benefits to California of this research and provide recommendations, as needed, to enhance tangible benefits.
- Provide recommendations regarding information dissemination, market pathways or commercialization strategies relevant to the research products.

The Contractor shall:

- Prepare a draft list of potential TAC members that includes name, company, physical and electronic address, and phone number and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting. This list will be discussed at the kick-off meeting and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members and ensure that each individual understands the member obligations described above, as well as the meeting schedule outlined in Task 1.11.
- Prepare the final list of TAC members.
- Submit letters of acceptance or other comparable documentation of commitment for each TAC member.

Deliverables:

- Draft List of TAC Members
- Final List of TAC Members
- Letters of acceptance, or other comparable documentation of commitment for each TAC Member

Task 1.11 Conduct TAC Meetings *(The Contract Team will finalize this task and task 1.10)*

The goal of this task is for the TAC to provide strategic guidance to this project by participating in regular meetings or teleconferences.

The Contractor shall:

- Discuss the TAC meeting schedule at the kick-off meeting. The number of face-to-face meetings and teleconferences and the location of TAC meetings shall be

determined in consultation with the Commission Contract Manager. This draft schedule shall be presented to the TAC members during recruiting and finalized at the first TAC meeting.
- Organize and lead TAC meetings in accordance with the schedule. Changes to the schedule must be pre-approved in writing by the Commission Contract Manager.
- Prepare TAC meeting agenda(s) with back-up materials for agenda items.
- Prepare TAC meeting summaries, including recommended resolution of major TAC issues.

Deliverables:
- Draft TAC Meeting Schedule
- Final TAC Meeting Schedule
- TAC Meeting Agenda(s) with Back-up Materials for Agenda Items
- Written TAC meeting summaries, including recommended resolution of major TAC issues

TECHNICAL TASKS

The Contractor shall prepare all deliverables in accordance with the requirements in Task 1.5. Deliverables not requiring a draft version are indicated by marking "(no draft)" after the deliverable name.

Task 2 DESS Design

The goal of this task is to integrate DESS devices into the operation of a distribution circuit. A review of the existing system configuration must be conducted to determine the best location for the installation of the DESS devices. Of particular interest are locations on the distribution circuit that have high concentrations of PV systems. DESS have the potential to help mitigate the intermittency issues caused by PV systems. Additionally, an appropriate communication system needs to be designed and installed to allow for the remote monitoring and control of the DESS devices deployed in the field.

The Contractor shall:

- Develop a specification for DESS and procure DESS devices
- Analyze the existing circuit configuration, taking into account the load centers, the locations of control devices (regulators, capacitors) and location and size of distributed resources
- Determine the optimal location for the distributed devices
- Identify and collect baseline performance data to serve as a basis of comparison with data collected during the demonstration phase
- Investigate the communication environment in SDG&E's service territory. This includes geography and physical environment which could affect communication to the DESS devices

- Develop and document findings for this area in a formal written Baseline Data Report

Deliverables:
- Specification for DESS (no draft)
- Baseline Data Report (no draft)

Task 3 Techniques and Algorithms for the Control of DESS
The goal of this task is the deployment of DESS devices which can operate in a self-directed, autonomous manner to improve local operation or operate as a fleet to impact the operation of a whole distribution feeder. This task explores the application of techniques and algorithms in order to efficiently dispatch these devices.

The Contractor shall:

- Implement algorithms for the local, independent operation of the DESS devices
- Implement algorithms for the operation of the DESS devices in a "fleet" so they can provide the maximum benefit to the distribution circuit
- Design and develop the interfaces of the DESS devices with a remote controller
- Provide control schemes for local and remote operation of the DESS devices in the Monthly Progress Report
- Participate in a CPR and prepare a CPR Report as per Task 1.2

Deliverables:
- CPR Report

Task 4 Develop Test Plans for DESS
The goal of this task is to design a test plan which will document the operation of DESS on a real distribution network for functionality, safety and integration into distribution operations. The test plan shall include documentation of DESS operation under the following modes of operation:

- **DESS Independent operation**- System will charge and discharge in response to a pre-programmed schedule
- **Peak Load Management Mode**. System will discharge at varying levels according to an analog control signal. The system will calculate the required discharge relative to a remotely-set threshold value
- **PV Voltage Transient Support Mode**. In response to analog signals, charge or discharge to eliminate rapid power and voltage swings (flicker) on distribution systems where high-penetration levels of PV systems are found on distribution feeder circuits
- **Reactive Power Mode.** Systems will be designed to source or sink reactive power.

The Contractor shall:

- Determine Modes of Operation for DESS units
- Design tests which will demonstrate the successful operation of the DESS units under each of the modes of operation listed above
- Document and provide findings of the design tests in a DESS Test Plan.

Deliverables:

- DESS Test Plan (no draft)

Task 5 Conduct Test and Document Results

The goal of this task is to test the operation of several DESS units in a real distribution network in accordance with the Test Plan described in Task 4. The results shall be compared to the baseline and previous testing to determine relative improvements consistent with the objectives of the program.

The Contractor shall:

- Conduct the tests specified in Task 4
- Collect key data elements that shall be used to analyze system performance and develop cost and benefit analyses
- Analyze data to document/validate system impacts such as demand reduction, voltage regulation and reliability improvements
- Provide a Test Results Report

Deliverables:

- Test Results Report (no draft)